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Does MANET Have Senses? – An Intellectual Approach

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Abstract

MANET is a dynamic infrastructure less environment which plays vital role in communication networks for efficient data transfer among complex network environment. Recent developments in communication networks such as, routing algorithms, security measures and other implementations are significantly discriminating MANET environment from traditional infrastructure based network environment still there is a need for new routing methods and algorithms for better and secured data transfer parameters. Most of the algorithms are targeting parameters such as security, authentication, reach ability and mobility. These parameters are sometimes becoming senses of a network like human being. Senses such as, sight, hearing, smell, taste and touch of human acts as messengers which carries information from outside world and internal part of human body. Behaviours of these senses can be correlated with Gateway node on MANET. Gateway is special node on a network which acts as an inter-mediator between more than one groups of sub-network. This paper relates human senses with network behaviours from gateway node's perception.

Keywords: MANET, Gateway, Sense Organs, MANET Architecture, Applications, MANET sensing

1. Introduction

Communication Networks is one among evolutionary areas in computer science. In communication networks the technologies has enormous growth its evolutions were beyond the expectations. The technologies have never tied it with any future limitations. This property of communication networks has

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brought an interest in experimenting on networks with different approaches. The communication networks which are broad in its area can be classified into wired and wireless networks. The wireless communication networks supported the applications (such as medical conferencing in rural villages and emergency sites) to provide its services to rural and unreachable areas [29].

MANET is unique environment among various categories of wireless communication network which become the best solution for an infrastructure less environment [23] [24]. It is the unstructured network formed dynamically among a set of mobile nodes. With the help of request and respond mechanism connection between the nodes can be established by sending RREQ as signal and RREP as signal. There are higher chances of error in network due to the dynamic construction of network among multiple nodes. These errors can be efficiently identified by RRER. Due to these salient features MANET nodes works as Router, Transmitter, and Receiver.

MANET works on algorithmic (Protocols) based infrastructure, where these algorithms manages the dynamic nature of the network by developing an imaginary or timely infrastructure for the communication networks. The above said suggests that the network communication performance depends on how the algorithm performs. Most of the researches are still in process for developing efficient algorithms in communication networks. The research and developments will be based on assumptions that certain real time existing behaviours and criteria of living beings can be viewed from network environment which will increase performance issues on complex communication network based applications.

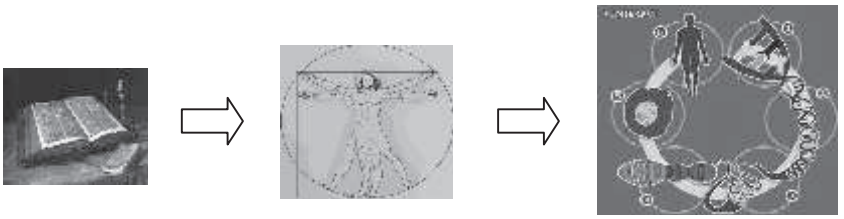

Fig. 1: Perfect Device and Networks

There is a saying in Sanskrit Scripture from the literature collection of “Vedas, Sutras, Shastras”: “*Shariram adyam khalu dharma sadhanam*”, which means our body, is the finest and the only instrument to performing all our world plate duties. Specifically, a human body is integrated with perfect communication process which is visualized in fig. 1. In a communication network the research and developments are always looking forward to reach a scenario/standard where it can achieve finest communication process as in human body.

Sensory are the basic and significant characteristic of human being. This sensing are becoming an efficient information carriers from outside the world, which helps the survival part of human being. Aristotle who was credited with the traditional classification of the five sense organs: sight, smell, taste, touch, and hearing. In the year 1760's, the famous philosopher Immanuel Kant proposed that our knowledge of the outside world depends on our modes of perception. Human body consists of the 5 sense organs with specialized cellular structures that have receptors for specific stimuli. These cells have links to the nervous system and thus to the brain this can be visualized as shown in fig.2.

Like human being, gateway is a special node in MANET which interconnects more than one sub networks. Behaviour of gateway node can be visualized in terms of various senses of human beings. This node acts as a sense organ as shown in fig.2 for collecting information from other node in the network these information’s are effectively processed by the gateway node for smooth, safer, secure and faster data transfer in communication network. The fig.2 shows similar properties of human being and complex network structure in terms of various senses.

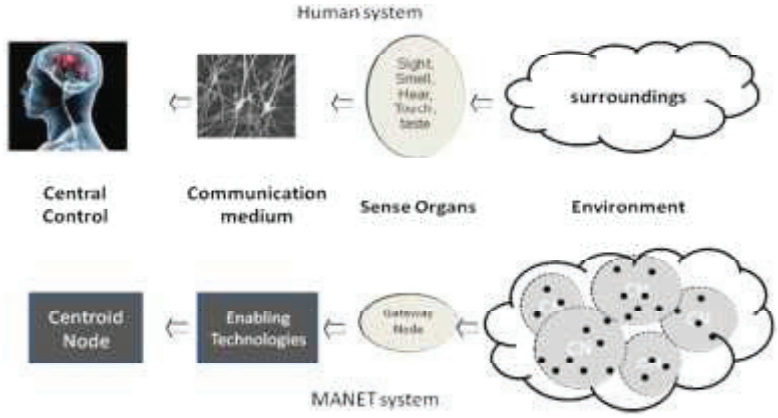

Fig. 2: Sense of human being versus Gateway.

This paper is organized as follows. The section 2 represents an overview of MANET architecture, taxonomy, challenges and its applications. Section 3 discusses the human senses and its behaviours. The relevant comparisons between the MANET and its sensing with the human sense have discussed in section 4. Section 5 deals with the central control of the senses collected by the network and section 6 concludes the paper.

1. Architecture And Applications Of MANET

A Mobile Ad hoc Network (MANET) can be constructed with a set of mobile nodes (or devices) which also works as a router. These mobile nodes organize and maintain a routing structure over a dynamic wireless environment. A MANET node may have an attached set of nodes and these nodes access the MANET via routing intermediate nodes. Due to mobility and its wireless interface the network topology and communication links in a MANET may change its state more frequently compare to fixed wired or wireless networks. These attributes and others influence development of better architecture for the MANET every time.

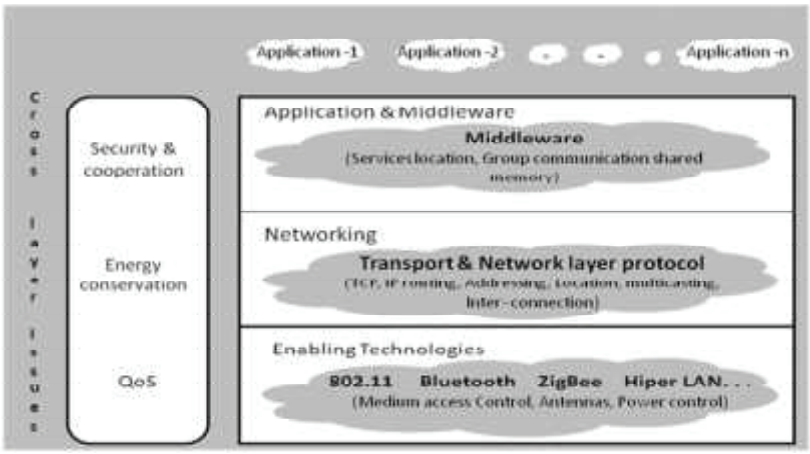

Fig. 3: Simple MANET Architecture

A large body of research has been accumulated to address these issues, and constrains. A simplified architecture of MANET is shown in fig.3 to understand the amount of research activities on ad hoc networks in an organized manner.

The research activities are grouped according to layered approach as shown in fig.3 where the enabling technologies (physical layer) include various networking standards. The success of a network technology is connected to the development of networking products at a competitive price. A major factor in achieving this goal is the mobile ad hoc network enabling technologies [1]. Some of the networks enabling technologies are IEEE 802.11, Bluetooth, ZigBee[36] [37] [38] etc as shown in table.1.

Table.1: Mobile Ad Hoc Network's Enabling Technologies

Technology	*Frequency*	*Range*	*Theoretical Bit Rate*	*Power Consumption*
IEEE 802.11b	*2.4 GHz*	*25–100 m (indoor)* *100–500 m (outdoor)*	*1, 2, 5.5 and 11 Mbit/s*	*~30 mW*
IEEE 802.11g	*2.4 GHz*	*25–50 m (indoor)*	*Up to 54 Mbit/s*	*~79 mW*
IEEE 802.11a	*5 GHz*	*10–40 m (indoor)*	*6, 9, 12, 24, 36, 49 and 54 Mbit/s*	*40 mW, 250 mW or 1 W*
Bluetooth (IEEE 802.15.1)	*2.4 GHz*	*10 m (up to 100 m)*	*1 Mbit/s (v1.1)*	*1 mW (up to 100 mW)*
UWB (IEEE 802.15.3)	*Mostly 3 – 10 GHz*	*~10 m*	*110 – 480 Mbit/s*	*100 mW, 250 mW*
IEEE 802.15.4 (for example, Zigbee)	*868 MHz, 915 MHz or 2.4 GHz*	*10–100 m*	*20, 40 or 250 kbit/s*	*1 mW*
HiperLAN2	*5 GHz*	*30–150 m*	*Up to 54 Mbit/s*	*200 mW or 1 W*
IrDA	*Infrared (850 nm)*	*~10 m (line of sight)*	*Up to 4 Mbit/s*	*Distance based*
HomeRF	*2.4 GHz*	*~50 m*	*1 Mbit/s (v1.0)* *10 Mbit/s (v2.0)*	*100 mW*
IEEE 802.16	*10–66 GHz*	*2–5 km*	*32 – 134 Mbit/s*	*Complex power control*
IEEE 802.16a	*< 11 GHz*	*7–10 km (max 50 km)*	*up to 75 Mbit/s*	
IEEE 802.16e (Broadband Wireless)	*< 6 GHz*	*2–5 km*	*up to 15 Mbit/s*	

The early Mobile ad hoc network applications and its deployments have been military oriented, while the non-military applications have also grown substantially. MANETs have attracted considerable attention and interest from commercial business industry as well as the standards community with the rapid advances in the recent years.

Most of the functionalities of the networking protocols (i.e., network and transport protocols in the internet architecture) need to be re-designed to cope with the self-organizing, dynamic, volatile, peer-to-peer communication environment. New protocols need to be developing to make the communication more effective and efficient based on architecture and system design limitations.

1.1. Challenges and Design Considerations on MANET

MANETs have several silent characteristics which bring more challenges for network researches and engineers. Some of the characteristics are as follows [28]:

i. Wireless Interface

Capacity Constraints: Wireless bandwidth is generally insufficient and expensive to own. [11] The clients in multi-hop wireless networks are generally equipped with a single wireless interface for limiting the communication capacity.

Unreliable Communication Medium: The wireless medium used for communication in multi-hop wireless networks is prone to errors due to interference noise generated from transmissions of other wireless

devices in the vicinity as well as multi-path fading effects [12]. This makes extremely challenging to provide any guaranteed packet delivery.

Unpredictable Channel Access Delay: As there is no centralized controller in a multi-hop wireless network, media access control is based on a distributed mechanism random back offs. This leads to the difficulty in calculating and guaranteeing tight delay bounds generally required for real-time communication.

Inaccurate Bandwidth Estimation: Available wireless channel bandwidth at a mesh client or router is difficult to be accurately determined, as it is affected by many factors, including the traffic load in the wireless transmission and sensing range, node mobility and the general variability of wireless links.

ii. Neighbors and neighborhood

The performance of an ad hoc network depends on the interaction among communicating entities in a given neighbourhood. A node starts communicating with other nodes by discovering set of nodes within its direct communication range. Once this information is gathered, the node keeps it in an internal data structure which can be used in different networking activities such as routing. The behaviour of an ad hoc node depends on the behaviour of its neighbouring nodes because it must sense the medium before it starts transmitting packets to nodes in its interfering range which helps to avoid collision. Node discovery can be achieved with periodic transmission of beacon packets (active discovery) or with promiscuous snooping on the channel to detect the communication activity (passive discovery) [14]. Many algorithms are available for node discovery [39] [40] [41].

iii. Dynamic Network Topology

The network topology will be typically multihop due to arbitration in nodes position which will create new network partitions frequently. This mobility on nodes location may sometime cause packet losses [14] [25] [25].

iv. Energy constrained operation

Mobile devices in a MANET must operate under energy constraints since they typically rely on a battery, which has a finite capacity. For these mobile nodes, the most important system design criteria for optimization may be energy conservation [2]. Thus energy represents one of the greater constraints in designing algorithms for mobile devices [3]. It is interesting to notice that energy conservation is related to all network layers [4] [5] including MAC [6], routing [7], and application protocols for MANET [8]. Power-aware protocols are often developed based on the techniques like active and standby modes switching, power setting, and retransmission avoidance [14] [28].

v. Security

MANET is generally more prone to physical security threats than fixed-wired networks [9] [10]. Factors such as the broadcast nature of the wireless channels, absence of a fixed infrastructure, dynamic network topology, collaborative multi hop communication among nodes and self-organizing characteristics will increase vulnerability of a network. The starting point to provide a proper security solution for a mobile ad hoc network is to understand the possible forms an attack can happen.

In recent years, the security issues on MANET have become one of the primary concerns. The MANET is more vulnerable to be attacked and these vulnerabilities are nature of the MANET structure that cannot be removed. As a result, attacks with malicious intent have been devised to exploit these

vulnerabilities and to perform the MANET operation. Attack prevention measures, such as authentication and encryption can be used as the first phase of defence for reducing the possibilities of attacks. These techniques have a limitation on the effects of prevention techniques in general which are designed for a set of known attacks. Intrusion detection is another security mechanism which will work based on "detect and response" phenomena. Table 2 shows attacks on MANET at different levels of communication networks based on different layers [15].

Table.2: Attacks on MANET at different Levels of Communication

Layer	Attacks
Application Layer	Repudiation, data corruption
Transport Layer	Session Hijacking, SYN flooding
Network Layer	Wormhole, blackhole, Byzantine , flooding, resource consumption, location disclosure attacks
Data Link Layer	Traffic analysis, monitoring, disruption MAC (802.11), WEP weakness
Physical Layer	Jamming, interceptions, eavesdropping

1.2. MANET Taxonomy

MANET is a collection of wireless mobile nodes which dynamically form a temporary network without using any existing network infrastructure or centralized administration. These are often called infrastructure-less networking since the mobile nodes in the network dynamically establish routing paths between themselves. Recent typical applications of a MANET include battlefield coordination and onsite disaster relief management.

i. Node

Node is a device (router or host) which implements IP on infrastructure less Network.

ii. Link

Link is a communication facility on a layer below the network layer where nodes exchange IP packets. In MANET the quality of link frequently flouts with respect to parameters such as mobility of neighbourhood, and other properties of ad hoc network in a shorter time scale [27].

iii. Neighbor

Two nodes are neighbours if and only if their links intersect, i.e. data may be propagated between them without relying on assistance of any forwarding node [27].

iv. Next hop

A neighbor which has been designated to forward packets along the way to its destination is referred as Next hop [27].

v. Gateway

Gateway is a special node on a network. Each member node, hearing a hello beacon, can apply for the right to become a gateway. The role of the gateway is to interface with other administrative domains. The gateway property is a dynamic one and is granted and revoked by the central authority followed by a gateway request from a node which has setup a neighbour route between itself, the interior gateway, and an exterior gateway, which is an opposite counterpart in another domain.

vi. Router

Router is another kind of node which forwards IP packets between some other node of the same network.

vii. Broadcast

An interface supporting more than two attached routers together with the capability to address a single physical message to all of the attached routers (broadcast). The set of nodes receiving a given physical broadcast message are the neighbours of the node originating the message. These receiving nodes will themselves be neighbours with one another. An Ethernet segment is an example of a broadcast interface.

viii. Flooding

Flooding is the process of delivering data or control messages to every node within the ad hoc network [27].

ix. Mobility

Mobility is the relative nodes movement, which depends on node speed and movement pattern [30]. As the devices are easily portable and the scenarios of deployment are inherently dynamic, *mobility* becomes one of the key characteristics in most of these networks. The mobility impacts MANET in multiple ways, such as network capacity [32], routing performance [33] and cluster maintenance [34]. Many studies have been done on the mobility based on routing performance and clustering etc [31].

x. Infrastructure

Current trend in networking shows a paradigm shift towards end-to-end service. The plethora of network services either implemented or in the stage of development, it is nearly impossible to design a networking infra-structure by considering all overheads. Such an attempt will result in huge information being stored per hop to understand and route traffic and this will result in an explosion of state information per hop. The right way to approach the problem is to concentrate on designing a networking infrastructure which will satisfy a few basic requirements and constraints. Then various end-to-end services can then be built over that infrastructure.

As the MANET devices have the limitations of energy, processing capacity, memory etc. Since it makes it difficult for the node to carry out more functionality overheads, the idea of sense organs in MANET is nearly impossible for small networks. But the same can be possible when the network consist of large number of nodes with sub-MANETs.

1.3. Applications of MANET

The early MANET applications and its deployments were military oriented whereas later non military applications have also grown substantially. With an advance in MANET, ad hoc networks have attracted considerable attention and interests from commercial business industry as well as the standards community.

Some of the applications of MANET are as follows;

a. Tactical networks used for military communication, operations and in automated battlefields [21].
b. Sensor networks applications, smart sensor nodes and actuators can help end users to manage home devices locally and remotely [22].
c. Environmental applications include tracking the movements of animals (e.g., birds and insects), chemical/biological detection, precision agriculture, etc. Tracking data highly correlated in time and space, e.g., remote sensors for weather, earth activities [22] [35].
d. Emergency services such as search and rescue operations, as well as disaster recovery; e.g., early retrieval and transmission of patient data (record, status, diagnosis) from/to the hospital, replacement of a fixed infrastructure in case of earthquakes, hurricanes, fire etc. [21].
e. Commercial environments like Electronic payments from anywhere (i.e., taxi), in business dynamic access to customer files stored in a central location, provide consistent databases for all agents, mobile office.
f. Vehicular services like transmission of news, road condition, weather, music local ad hoc network with nearby vehicles for road/accident guidance [22].
g. Home and enterprise networking location aware services like home/office wireless networking (WLAN) e.g., shared whiteboard application; use PDA to print anywhere; trade shows [21].
h. Personal Area Network (PAN).
i. Educational applications such as setup virtual classrooms or conference rooms, setup ad hoc communication during conferences, meetings, or lectures [21].
j. Entertainment like multi-user games.

Other applications are also available for MANET where every application varies from one another in terms of basic requirement of the resources and devices. Thus all the applications are developed based on the platform of resource and technologies and limitation of MANET.

2. Human Senses

Human senses can be viewed as internal and external senses

2.1. Internal Senses

Internal senses also referred as implicit senses will be triggered inside the human body due to internal stimuli / operation where as external senses are related with an information from outside world For example, an insufficient amount of food is detected as so called hunger, an insufficient amount of water is thirst And feel tired when deleterious materials are present in our reactions are referred as internal senses [11]. Also, there are no internal senses to warn us that an artery is clogging, a tumor is growing, or the immune system is functioning improperly until there is an immediate threat to survival like pain. It tells that something is wrong within the body but not what is causing it [11].

2.2. *External Senses*

External senses can be viewed as an intermediate layer between human and external world. To gather the information a person needs for his or her survival, the external senses evolved to detect stimuli that represent threats and opportunities. These senses detect different kind of external stimulus as follows.

1) The eye detects a pattern of form and color formed by light.
2) The ear detects variations in the compression of air.
3) Receptors on the surface of the body detect pressure.
4) The nose detects several kinds of individual molecules.
5) The mouth detects the properties of some molecules, such as sweet, salty, etc.

3. Senses of MANET

In order to survive, every creature must respond appropriately to the other objects in its environment. All information from the external world is brought by it senses. It cannot respond appropriately if an object is not detected or if it is detected incompletely or incorrectly. So detection of stimuli by the senses is the indispensable step in survival.

Sense organs are an important part of human body which are directly connecting to the nerve and cognitive structure of the brain. Sensing is done at primitive level of the cell and integrated into sensations in the nervous system. The sense organ grasps or collects data from its surrounding and passes this data to the brain (through nervous system) for processing and the brain makes the body to react for different situations. The same idea is viewed with the MANET scenario which can be approached from the nodes architecture and implied protocols in MANET.

The Basic function of sense organ in human body is to collect information from the outside world or environment. The idea of sense organs in MANET is nearly impossible because of its processing and power limitations in small network. But the same can be possible when the network consists of large number of nodes and the nature of network is distributed. The MANET under our scope is a collection of multiple sub-MANETs. In comparison to the Sensing of human being, the MANET sensing also can be discussed as internal sensing and external sensing.

3.1. Internal Sensing in MANET

The internal sensing in MANET is performed by the different algorithms used in the network. These algorithms are developed to perform the information processing, maintenance, and decision making in the Ad hoc network. The internal sensing in MANET also has an important effect on performance of a network.

3.2. External Sensing In MANET

The gateway is a selected node which is one hop away from the foreign agent. These are usually multi-homed nodes as shown in fig.4 (a).

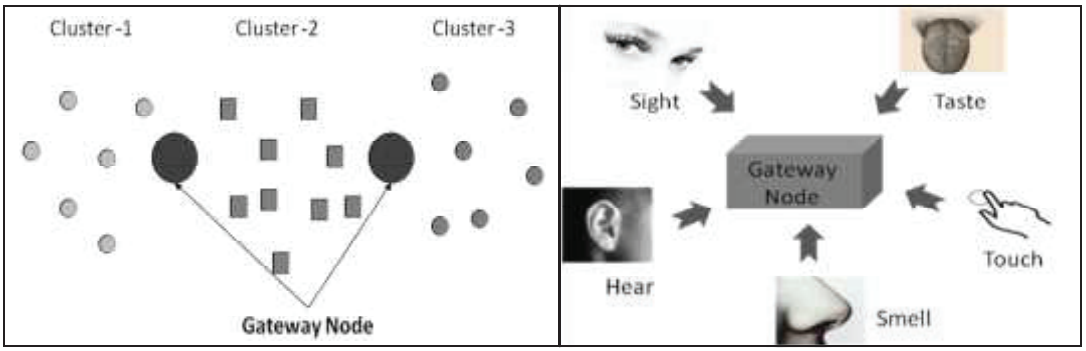

Fig. 4. (a) Gateway nodes in the MANET; (b) Human Senses from network perception

Gateway nodes are generally used for routing between clusters which acts as a firewall for the MANET when connected to internet. The gateway is the node of a subnet which connects a subnet to the external subnets and foreign networks. It also collects information from the foreign network for the communication process. In this paper the MANET gateway is correlated with the functionalities of human sense organs as shown in fig.4 (b).

Like external senses of human, the MANET senses detects a different type of external stimulus which is summarized in fig.5:

Touch	Sight	Hear	Smell	Taste
Gateway nodes are the neighbor node of neighbor network	Through the gateway only the MANET views the network	Gateways only hears the request of foreign network for Data exchange	Gateway for internet, secures the local network From the foreign network	Gateways smell the neighbor network stability and packet drop ratios

Fig. 5: Senses of Gateway node versus Human senses.

3.2.1. Sight

Eye is one of the unique senses of human being which is related with visionary system. It is a kind of optical system where the organs detect and convert light in to electro-chemical impulses in brain. On the other hand, it collects optical information from surrounding environment and regulates its intensity through a diaphragm which helps to generate respective images on cognitive system.

The sense of sight helps to recognize each other and learn about colour, motion and distance. In MANET the gateway node detects the neighbour networks presence in the environment. The gateway transmits this information to the brain such as master node where the information is used to select routing in MANET (refer fig.6).

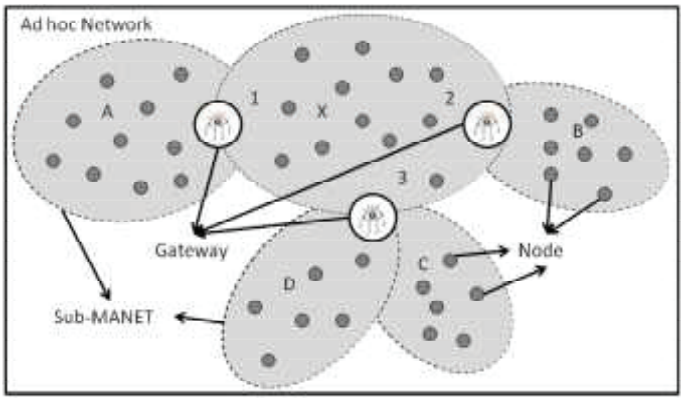

Fig. 6: Sight of MANET

There are four subnets (A, B, C, and X) connected through three gateways (1, 2, and 3). For the subnet X, the gateway-1 gives sight information for presence of a neighbour subnet A. Similarly gateway-2 gives sight information for the presence of B and gateway-3 gives sight information for C & D which are neighbour network to the subnet X. This information helps subnet X to promise its presence in the network.

3.2.2. Hearing

The ear is the organ of hearing in human. The sense of hearing helps us learn from each other through communication. Sound can produce patterns. The inner ear has chambers filled with a viscous fluid and small particles (otoliths) containing calcium carbonate. The movement of these particles over small hair cells in the inner ear sends signals to the brain that are interpreted as motion and acceleration.

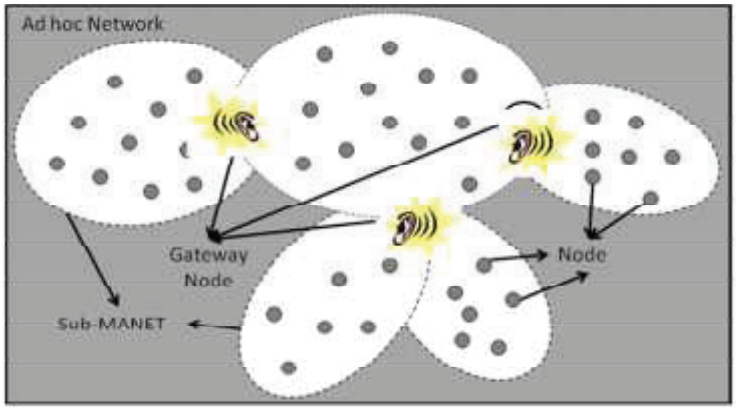

Fig. 7: Gateways as a Ears of MANET

In MANET, the gateway node only hears the requests made by the foreign neighbours as well as broadcasting information of its neighbour network which can be visualized from fig. 7. The gateway node receives the signals that are in the range of networks frequency. The hearing sense of MANET allows the

network to communicate with neighbours and carry more information to the master node (brain) for decision making.

3.2.3. Taste

Taste is primarily the property of toungh which helps to select and enjoy food.

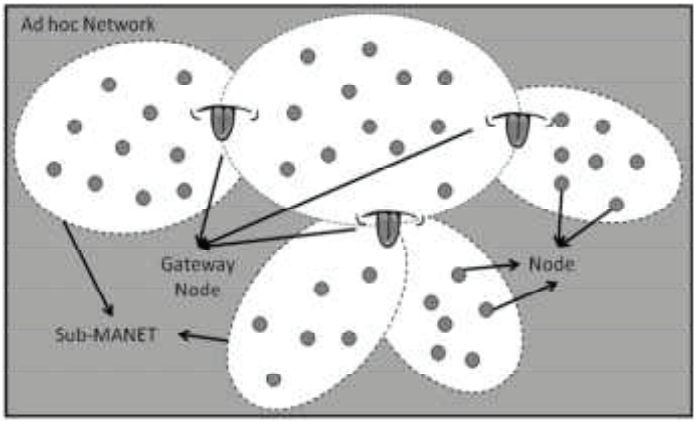

Fig. 8: Gateway's Taste on the neighbour networks.

The gateway node is connected with two or more networks hence it receive all updates from the connected network. This frequent updates can be processed by different network to take routing decisions. This update helps in identifying the stability, network density and drops in the network. The reliability of the network communication can be improved and better routing decision can be taken based on the information from gateway nodes. The taste sense in the MANET can be visualized in fig. 8.

3.2.4. Smell

The nose is the organ responsible for the sense of smell. The sense of smell helps in learning about unsafe conditions.

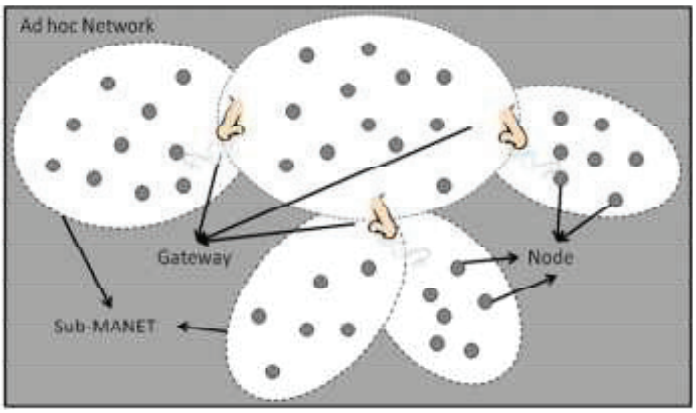

Fig. 9: MANET Smells for Security

In MANET, the Gateway is responsible for the sense of smell. It connects the subnet to external networks and can secure the network from external attacks. For example, the gateway used to connect ad hoc to internet. The sense of smell in MANET can be visualized as shown in fig. 9.

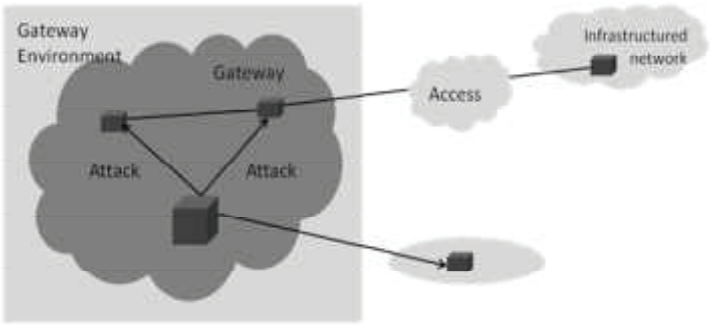

Fig. 10: Security on MANET from smell sense point of view.

The architecture of security prospects can be viewed as shown in Fig.10.There is no assurance of security in Wireless ad-hoc network, access network and the infrastructure network. The communication between the gateway and its client can be protected. Alternatively, the wireless ad-hoc network can be protected by using link-layer security. Nevertheless, the ad hoc network is vulnerable to DoS attacks and the availability of communication cannot be guaranteed. The gateway can provide its clients with the same level of security where access network and infrastructure network can provide to the gateway [13].

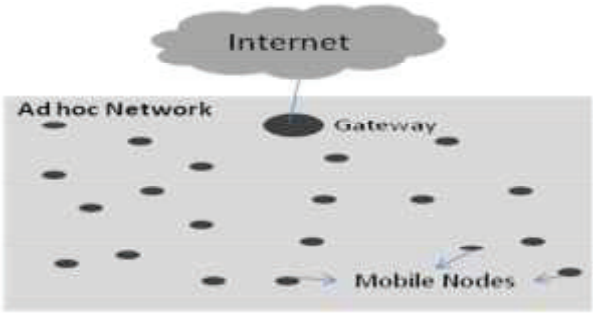

Fig.11: Ad-hoc network with Internet access: Gateway smells authorization of foreign request.

Initially, nodes belong to an ad-hoc network can only communicate among themselves, using multi-hop wireless transmission. However, there are some solutions which extend this architecture providing Internet access for ad-hoc nodes. This means that one (or more) of the node have at least two network interfaces. One interface making it part of the ad-hoc network and another one connecting to the Internet (see fig.11). The gateway smells the authorization of foreign (internet) requests and provides the security to the network.

3.2.5. Touch

The sense of touch helps to learn about external environment by feeling it and learning the size, texture and shape of things. In MANET, the gateway nodes are locally hosted on two or more subnets

(also named as multi-homed node). Gateway nodes in the subnet thereby are the nodes with foreign network nodes as neighbours and can directly touch the neighbour network.

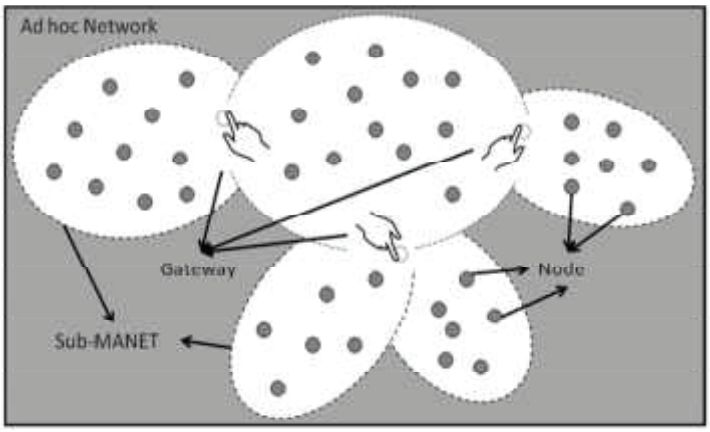

Fig. 12: The Gateway Node Touches the Neighbour Network

The touch sense in MANET helps in learning about neighbour networks size, density and basic routing information. The Gateways are also a part of neighbour network which can easily get the information of neighbour networks as visualized in fig. 12. These nodes are connected to the master node of the network either directly or through some path (more than one hop distance) and the information collected by the gateway nodes touch sense are transferred to the master node for decision making.

In order to enable inter-MANET routing, gateways required to discover other external MANETs by communicating with gateways in the external MANETs. On the other hands, gateways also need to share the external MANET information with other internal gateways [12]. So the gateways share their touch to other networks with the subnet.

4. The Brain of MANET

Mobile nodes are logically partitioned into groups referred as clusters. These clusters should be independently controlled and dynamically reconfigured as nodes change its position in a dynamic network. One node is chosen within each cluster to perform the function of a master and some nodes to perform the function of gateways between clusters. The gateway node participates in two or more clusters and is under the control of two or more master nodes with time-multiplexed manner. The cluster architecture is robust in the face of node mobility by judicially selecting stable nodes as masters. The location management overhead can be greatly reduced with the help of master nodes.

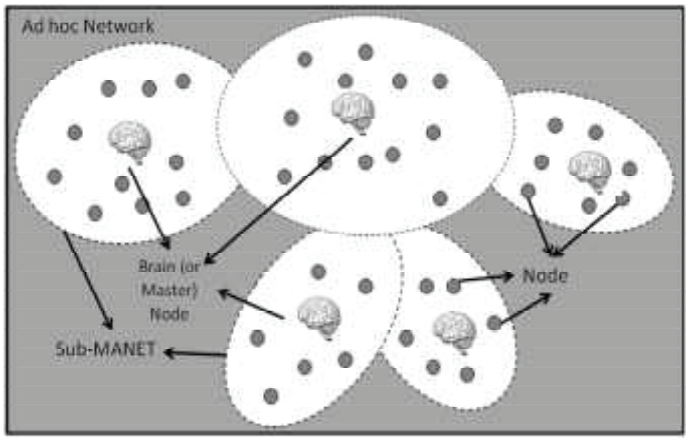

Figure 13: Brain of the MANET

The master node can be visualized as brain of MANET which collectively maintains network topology and provides information on routing path and node location [17] [18]. The master node performs processing and responding action for the network [16]. Timely decisions are made by the brain node in selection of route and network maintenance. Fig. 13 gives an illustration of brain node in the mobile ad hoc network.

4.1. Inter-Subnet activity

In the sub-MANET, the master node has to perform maintenance activities were the maintenance includes the procedure for modifying the cluster structure based on the movement of a cluster member outside an existing cluster boundary, battery drainage of cluster-heads, link failure, new link establishments, addition of a new node, node failure etc. [19] [20].

4.2. Processing of sensed data and decision making

All received information by the gateway is transferred to the brain in a network. The brain processes the information and based on which it takes decisions. This decision includes inter-network routing, accessing foreign network services. For example, the stability of the neighbours are collected from gateways of the MANET and processed to find the path which is more stable for routing in the network.

5. Conclusion

MANET has higher influences in most of the network related applications due to the constraints and issues of existing infrastructure dependent environment. The behaviour of gateway node in MANET environment can be visualized in terms of various sense of human being. Brain is a primary part in human being which controls and coordinates internal and external behaviours of human body. Information received from various senses will be processed by the brain system and acts accordingly. These human senses can be visualized from a node referred as gateway node on MANET environment. Gateway is a special node, as a part of data transfer, which controls and coordinates information received from the network. This paper mainly focuses on architecture and applications on MANET and senses of gateway nodes with respect to the parameters such as security, mobility, reach ability and authentication.

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